2014 Community IPM Grants Program Final Report

Project Type: Implementation Project

Project Title: Development of a Weed Identification and Control Strategy Online Tool

P.I.: Jenny Kao-Kniffin, Assistant Professor, Department of Horticulture

Mailing address: Cornell University, Department of Horticulture, 134A Plant Sciences Building, Ithaca, N.Y. 14853

Telephone: (607) 255-8886

Fax: (607) 255-0599

E-mail: jtk57@cornell.edu

Abstract: Effective weed management in turf and ornamental landscapes requires proper identification of plants, but many practitioners have not received sufficient training in plant identification. With fewer turf short courses and weed identification workshops available to practitioners, there is now a greater demand for online resources. We have developed a free, online educational tool that assists in weed identification and determination of control strategies for turf and landscapes in NYS. Both conventional and alternative weed control strategies will be summarized for each plant species listed in the guide. Additionally, we have developed sets of laminated weed reference plants that can be provided to CCE and IPM educators as teaching material accompanying the online weed guide.

Background and Justification:

There is high demand by the turf industry for weed identification lessons and workshops. A recent survey conducted at the 2012 Turf and Grounds Expo on weed management needs identified a preference for more plant identification opportunities. The discontinuation of the Cornell Turfgrass short course has created a gap in training turf industry stakeholders the basics of plant identification. Proper plant identification is required to determine the most appropriate control strategies.

Cultural management strategies provide overall pest control with minimal need for conventional pesticide applications. However, determining adjustments to turf maintenance explicitly for the control of persistent weeds entails identifying the weeds correctly. For example, the dominance of ground ivy in turf landscapes could be indicative of poor drainage, while knotweed infestations indicate soil compaction, low pH, and poor drainage. Adjusting soil pH, improving drainage, and alleviating compaction are examples of cultural management strategies that can be utilized in response to particular weed species. In spite of using strong cultural management strategies, weeds can still persist in the landscape. Spot applications and non-routine (one-time) applications of conventional herbicides are useful in controlling weed populations before they become larger infestations. A growing list of conventional herbicides is available that targets groups of plants spanning a range of different life history strategies. The diversity of chemical formulations allows practitioners to selectively target weeds without injuring the desired turfgrasses. However, the use of these selective herbicides is contingent on the proper identification of weeds.

The proposed project addresses the following Community IPM priorities:

1. *Develop community IPM resources, such as brochures, websites, fact sheets, and manuals;*
2. *Develop IPM educational programs, such as IPM workshops or IPM curriculum;*
3. *Educate others about IPM, through outreach and demonstrations. Audiences might include school administrators, teachers and students; landscape and structural pest management professionals; vector control specialists; employees of municipalities; nuisance wildlife control operators; golf course personnel; arborists; rights-of-way managers; day care operators and the general public.*

Objectives: The proposed project focused on the dissemination of IPM knowledge in weed management to stakeholder groups in both the NYS turf and landscapes industry and school grounds administration. The measurable outcomes are as follows:

Objective 1: Develop a free, online weed identification tool that matches weed species with alternative and conventional weed control strategies.

Procedures: We have created a plant identification guide that includes weed species found in turf and landscapes across NYS. The guide consists of a series of categories on plant morphologies that aid in the identification of a weed. The weed identification tool allows users to click on plant features and morphologies that narrow down the pool of potential weeds for improved identification. The Cornell weed identification tool will be located on the Department of Horticulture website and will be linked to multiple sites featuring horticultural research and extension resources. Each weed species contains options linking to information on conventional, reduced risk, and minimal risk chemical control strategies. Non-chemical control strategies will be summarized under a separate menu highlighting the use of cultural management, repetitive seeding, biological control, thermal weeding, turf scalping, and weed-suppressive turfgrass varieties. The chemical-based control strategies include matches of weed species to their specific chemical control options.

Objective 2: Development and dissemination of IPM curriculum resources for weed

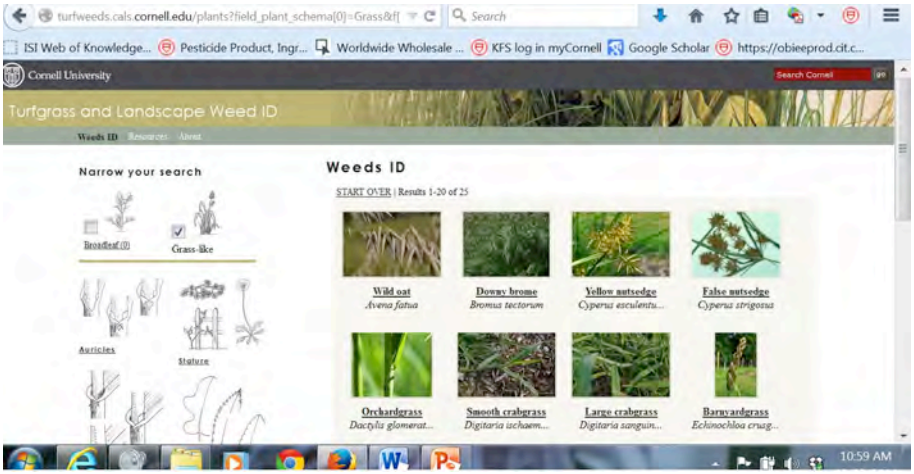

Figure 1. Image from the 'grasses' category of the Cornell Weed ID website. The number of grasses appearing on the right hand of the screen narrows down when grass identifiers are selected (shown on the left hand screen).

identification and management workshops.

Procedures: We will develop curriculum and teaching tools that accompany the online weed ID guide for use in CCE and NYSTA educational programs. Maintaining living plant material for weed identification is costly and time-consuming for the Cornell Turfgrass program. The increasing costs of greenhouse rental space and technical support for growing plants is challenging to maintain throughout the year, especially as state support for technician salaries have been cut out completely from Cornell University's budget. We are supplementing teaching materials for weed identification using laminated reference plants. Aboveground plant material spanning across life growth stages (seedling to adult flowering and seed-bearing stages) have been laminated for viewing both the top and bottom of the herbarium specimen. These robust laminated sheets of weed reference plants will be provided to educators that are teaching weed identification and management courses and workshops. The laminated plants will also be scanned and uploaded onto the weed gallery for public viewing (Fig. 2). An intended goal is to provide a complete set of laminated weed references for training workshops focusing on turf and landscape management.

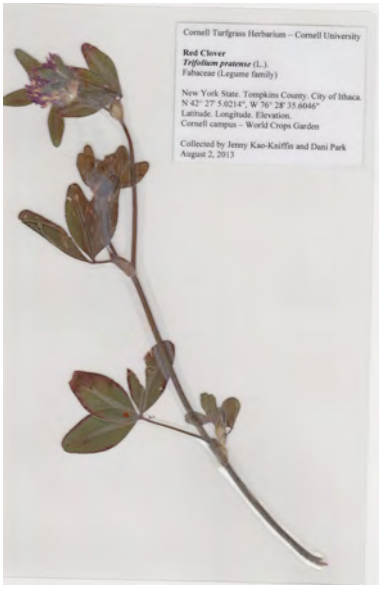

Figure 2. Example of a laminated herbarium specimen for use in weed ID workshops and as scanned images for the online weed ID tool. Top image of red clover (*Trifolium pratense*) is shown.

Project Evaluation: We will summarize results from weed control experiments conducted at Cornell and other turf programs for use in the weed ID links on weed control strategies. Each link will provide options for free downloads of brochures, factsheets, and photos summarizing the control strategies specific to the weed species. We will record the number of visits to the weed ID website and we will record requests for teaching materials that accompany weed ID courses and workshops. Additionally, the weed ID and control strategy online tool will be shared with stakeholders through presentations at NYS turf and landscapes workshops and conferences. A select number of presentations will be followed with a reflective survey of audience members. We will ask the audience to evaluate the usefulness of the online tool, laminated weed reference materials, and power point presentations presented at the meetings and workshops.

Results and Discussion

The target date for public use of the weed ID tool is April 2015. The website was featured at the Turf and Grounds Expo in November 2014 as part of the Weed ID workshop and the NYS IPM reports presentation. We received very positive feedback from conference attendees that are excited to use the platform.

The outcomes of the proposed project will serve school districts across NYS, in addition to the broader turf and landscapes industry. In addition, we expect that the weed ID and control strategy online tool will be used by gardeners and out-of-state stakeholders. We plan to present the online tool and weed reference materials to school superintendents, groundskeepers,

lawncare providers, and pesticide applicators through NYS turf and landscapes conferences and workshops. We estimate the following outcomes generated from this project:

· Number of contact hours = 1,000 hours (100 people x 1 hour presentation x 10 venues) generated through presentations at NYS turf and landscapes conferences and workshops featuring alternative weed management strategies

· Increase in knowledge or awareness of IPM = 1,500 copies of brochures, factsheets, and resource guides on weed identification and control strategies through the Cornell Turfgrass website and at the NYS turf and landscapes workshops and conferences.